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EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
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November 1, 2005

In the Matter of	Docket No. 2002-053 (Wetlands) File No. 50-562
Steven D. Peabody	Docket No. DEP-04-400 (Title 5) Newbury

Tentative Decision

Introduction

I adopt in part and reject in part the Recommended Decision of the Administrative Magistrate on these consolidated appeals under the Wetlands Protection Act and Title 5, the state sanitary code. The applicant seeks to construct a pile supported house, driveway, and septic system on Plum Island in Newbury, directly on the Atlantic Ocean. Plum Island is a barrier beach, and the lot contains several resources areas protected under the Department's wetlands regulations: coastal beach, coastal dunes, barrier beach, and land subject to coastal storm flowage. 310 CMR 10.27, 310 CMR 10.28, 310 CMR 10.29, 310 CMR 10.04. At issue in the wetlands appeal is the siting of the project where all potential impacts are entirely within the dune closest to the coastal beach, also known as the primary coastal dune. See, e.g, Draft Environmental Impact Report (DEIR), Petitioner's Exhibit 11, page 2. The Title 5 appeal concerns the siting of the septic system.

The proposed project is a 1080 sq. ft. house with a 900 sq. ft. deck on piles, a septic system and parking area of gravel located underneath, and a 300 sq. ft. driveway. In addition to reducing impacts through project design, the applicant has proposed mitigation of 5,490 sq. ft. of dune vegetation plantings and permit conditions that would require removal of the house and septic system if erosion reaches them. The Department's Northeast Regional Office denied the project on the grounds that it did not meet the regulatory performance standards. Because this case raises critical and recurring issues about how coastal resources are defined and protected, I have reviewed the record in considerable detail.[1]

I adopt the conclusion of the Recommended Decision that the appeal was timely filed. While a late filed request for Department action is jurisdictionally fatal, I agree with the reasoning of the Administrative Magistrate that a prematurely filed request may be accepted, particularly in these circumstances where the outcome was known and the appeal was filed only one day early. Recommended Decision at 4-6. I also adopt the conclusion of the Administrative Magistrate that the septic system proposed by the petitioner must be constructed in full compliance with Title 5 rather than under the transition provision at 310 CMR 15.005(5). Recommended Decision at 20-22. As discussed further below, I adopt the conclusion of the Recommended Decision that the current Title 5 regulations rely on the Federal Emergency Management Agency (FEMA) National Flood Insurance Program (NFIP) maps (abbreviated as FIRM for Flood Insurance Rate Map) to determine the location of

[1] I am familiar with some of the materials in the record prepared for the Plum Island Water and Sewer Project, which continues to be under discussion at the Department. I also reviewed documents referenced by both parties but not included in the record due to their volume, e.g., the Coastal Construction Manual prepared by the Army Corps of Engineers and the Guidance for Coastal Flooding Analyses and Mapping prepared by the Federal Emergency Management Agency. In addition but not specific to this case, I have reviewed the level of protection afforded by state law for coastal communities in Massachusetts, following the recent devastation from hurricanes Katrina and Rita along the Gulf coast. The state Wetlands Protection Act extends to coastal resource areas such as dunes not covered by federal law.

velocity zones, so that 310 CMR 15.213(2) is not an adequate basis for denial of a Title 5 permit. Recommended Decision at 22-24.

Finally, I reject the conclusion of the Recommended Decision that this project meets the performance standards to protect the barrier beach and coastal dune under the wetlands regulations. The applicant seeks to capitalize on recent accretion and growth of the primary dune by constructing a new house on it, accepting that it must be moved, as in the past, when erosion threatens again. While the applicant, or a subsequent owner, would assume the risk and bear the cost of this arrangement, the Department must protect the public interest in storm damage prevention and flood control. Based on the regulatory standard and support in the record on the dynamic nature of coastal processes at this site, I conclude that this project, within a primary coastal dune on a barrier beach, will adversely effect its natural process of changing form and moving laterally in response to wind and wave action; it is precisely this ability of dunes and barrier beaches to transform and migrate that sustains their ability to prevent storm damage and provide flood control, protecting more inland areas.

Title 5 Appeal: Transition Rules and Velocity Zone

I concur with the reasons stated by the Administrative Magistrate as to the applicability of the Title 5 transition rules. I find no evidence that the lots were endorsed by the Planning Board under the Subdivision Control Law, so 310 CMR 15.005(5) does not apply. And under the transition rules at 310 CMR 15.005(4), the upgrade of the system on Lot 208 for the existing house on Lot 207 is the only construction allowed on these four contiguous lots without full compliance with Title 5.

Under the Title 5 regulations, new construction is prohibited without a velocity zone, defined as a coastal area of special flood hazard within the 100 year flood plain which will support waves greater than 3 ft in height. The boundary of the velocity zone "shall be determined by reference to the National Flood Insurance Program flood data and Flood Insurance Rate Maps for each community." 310 CMR 15.002. I conclude, as did the Administrative Magistrate, that the intent of this provision was to allow reliance on the location of velocity zones, or "v-zones," as shown on the maps, as opposed to allowing case-by-case field determinations based on information more recent than the data used to generate the map. The septic system in this case is not within the v-zone established by the FIRM, and there is no basis for concluding that the flood data on which the map was based should yield a different result.

However, I am concerned that reliance solely on outdated maps is misplaced given the shifting nature of coastal resources. There is evidence in the record that FEMA's maps may be outdated and not reflect current conditions. See letter from FEMA to Stephen Peabody dated February 13, 2004, Petitioner's Exhibit 23. Although there are differences between the federal program, Title 5, and the Wetlands Protection Act, competing definitions with differing results are to be avoided in related regulatory schemes. Therefore, I direct the Department to propose for public comment a revision to the definition in the Title 5 regulations that will combine the administrative efficiency of maps while preserving the accuracy of current field conditions. A regulatory provision which meets this goal is the methodology for determining the boundary of bordering land subject to flooding, which establishes a presumption of accuracy of the NFIP maps but allows the presumption to be overcome by competent evidence from a credible evidence from a registered professional engineer or other competent professional. See, e.g.,

310 CMR 10.57(2)(a)3. The definition should reference the revision of the FEMA regulations to include primary dunes as coastal high hazard areas and the state should continue to work with FEMA to promote consistency of delineation of the "dune closest to the coastal beach" and the "primary frontal dune" to eliminate confusion over this issue in the future.

Primary Coastal Dune on Barrier Beach under the Wetlands Protection Act

In this case, the Recommended Decision reflected the testimony, which focused on the location of the velocity zone, the estimated extent of wave action near the septic system, and the effectiveness of the vegetation plan. The Administrative Magistrate was persuaded that conditions requiring removal of structures if exposure of the septic system due to wind or wave induced erosion were to occur could allow the project to proceed. Recommended Decision at 16. She accepted the proposed vegetation plan as providing sufficient replacement for disturbed dune grass areas, and recommended conditions for long-term monitoring and replanting. Recommended Decision at 19. After addressing the issue of the extent of the primary dune on the site and reviewing the performance standards for work in a primary dune on a barrier beach, I apply the performance standards to the site and conclude they have not been met.

Definition of Coastal Dunes; Evidence of a Primary Dune at the Site

The wetlands regulations define "Coastal Dune" as "any natural hill, mound or ridge of sediment landward of a coastal beach deposited by wind action or storm overwash." Dunes extend from the landward edge of coastal beach inland to the landward edge of sediment deposited by wind or storm overwash. 310 CMR 10.28(2). A barrier island generally consists entirely of coastal beaches and dunes. 310 CMR 10.29(2). All coastal dunes are likely

significant to storm damage prevention and flood control, and all coastal dunes on barrier beaches and coastal dune closest to beach are per se significant to storm damage prevention and flood control. 310 CMR 10.28(1). This regulatory language distinguishes dunes on barrier beaches and the "primary" dune – as opposed to secondary dunes that may have developed landward of the primary dune – and the heightened significance derived from their presence at a site warrants greater scrutiny.

There is some confusion in the testimony over the presence and extent of the primary dune, the dune closest to the beach, under the wetlands regulations, and the "primary frontal dune," as defined by FEMA, at the site. The applicant has declined to identify the extent of the primary frontal dune, despite specific requests by the Office of Coastal Zone Management (CZM) and DEP, and FEMA has apparently not yet identified the primary frontal dune for purposes of the NFIP. See Petitioner's Exhibit 11, DEIR at 19; letter from to Stephen Peabody dated February 13, 2004 in Petitioner's Exhibit 23. The applicant offered the opinion that determining the landward extent of a primary dune is difficult to determine and subjective, and that the primary dune landward of the applicant's site lacks a distinct change in slope marking its toe. Humphries Rebuttal at B1 and B2. Nonetheless, FEMA revised its regulations and intends to revise its mapping to include "primary frontal dunes," so presumably their location can in fact be determined.[2] In any event, the concept of primary dune as the dune closest to the

[2] The record includes much discussion of the FEMA regulations and maps. The approaches to storm damage and flood control have historically differed. FEMA and the NFIP is designed to protect structures for purposes of insurance; the Wetlands Protection Act protects resource areas because their protection will in turn promote the prevention of storm damage and control flooding. FEMA defines its "Coastal High Hazard Area" as an area of special flood hazard extending from offshore to the inland limit of a primary frontal dune along an open coast and any other area subject to high velocity wave action from storms. 44 CFR § 59.1. A "Primary Frontal Dune" is a continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward immediately landward and adjacent to the beach and subject to erosion and overtopping from high tides and waves during major coastal storms. The inland limit occurs at the point where there is a distinct change from a relatively steep to a mild slope. 44 CFR § 59.1. A letter from FEMA, included in the record, confirms that the current procedure to map v-zones is to use most landward of 3 ft. wave height, 3 ft. below computed wave runup

beach is a concept within the state regulations independent of any definitional evolution of "primary frontal dunes" at FEMA.[3] The inclusion by FEMA of all primary frontal dunes in the velocity zone as a means to reduce potential for damage in these areas and to increase protection to inland areas is consistent with and supportive of the Department's protection of primary dunes under its regulations.

Based on the definition, I have studied the topographic and profile information in the record in some detail to draw my own conclusion about whether the landward boundary of the dune closest to the beach can be determined, and if so, where it is located. The applicant has provided profiles of the site, which borders an unpaved extension of 51st Street, as the ground elevation rises from the water to approximately 20 feet. Petitioner's Exhibit 11B, Sheet 2 0f 3. Continuing profile data along 51st Street, prepared for the Plum Island Water and Sewer Project, shows that the surface elevation drops to a low of less than ten feet at just west of a point identified as 2+73, or approximately 220 from the beginning of the paved section of 51st Street and then begins to rise. Inglin Direct Testimony, Attachment I. Both the ten foot elevation and the location on 51st Street as shown on the Sheet No. 53 plan and profile is

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elevation, or inland limit of primary frontal dune, whichever is farther landward. Because the current map for Newbury preceded the initiation of this method for determining V-zones, it does not reflect the new methodology.

The 1988 revision of the FEMA regulations, including primary frontal dunes within the definition of coastal high hazard area, reflects a resource-based protection similar to that afforded by our state law. As stated in the Federal Register explaining the rationale for the revision, FEMA investigated the extent of dune erosion in response to criticism from state and local governments that V-zone mapping underestimated high hazard areas. FEMA concluded that "the primary frontal dune would, in most cases, be completely eroded during the 100-year storm event." 52 FR 42117 (November 3, 1987). The "540 sq. ft. Rule" establishes the threshold for predicting erosion, so that a dune with a cross-sectional area of less than 540 sq. ft. above the still water flood level will not be credited with offering any protection to inland areas from wave action; larger dunes may attenuate wave action and be only partially eroded in the 100 year storm event. 53 FR 16269 (May 6, 1988), 44 CFR § 59.1, 44 CFR § 65.11. FEMA determined that it was "prudent" to classify all primary frontal dunes as V-zones, acknowledging both their importance in protecting inland areas and the potential for destruction of not only the dunes but for any structures that may have been built upon them. 52 FR 42117 (November 3, 1987), 44 CFR § 59.1, 44 CFR § 65.11. Under the FEMA revisions, primary frontal dunes are within the V-zone regardless of the height of the waves that may reach them. At least on Plum Island, the witness from CZM reports that in working with FEMA, they use the "second derivative slope, which measures how fast the slope is changing, to determine where the slope is changing the fastest on the landward side of primary dunes. See Inglin Rebutttal at para. 2.

[3] The applicant stated in the DEIR that all potential project impacts would be on the dune closest to the beach. Petitioner's Exhibit 11, DEIR at Section 1.5.

consistent with the delineation of the Coastal High Hazard and Limit of Coastal Dune as shown on the Plan of Wetland Resource Areas. Although the Plum Island Water and Sewer wetlands Resources Plan states that the delineation was done based on the federal definition of "primary frontal dune" in 44 CFR § 59.1, I have reached the same conclusion based on the state wetlands definition and have searched the record for evidence of any other indicia of the landward extent of this primary dune and found none.[4] Therefore, the proposed project would be constructed entirely within the dune closest to the coastal beach - or primary dune - on this barrier island.

Performance Standards for Coastal Dunes on Barrier Beaches

The Preamble for Barrier beaches and dunes sets forth the rationale for their protection under the Wetlands Protection Act. 310 CMR 10.27(1), 310 CMR 10.29(1). To protect inland areas from storm damage and flooding, the shape and volume of dunes will respond to natural processes as the dunes erode, supplying sand to the beach, and grow as sand from the beach is deposited by wind or waves to the dunes. Vegetation is a primary contributor to dune stability and growth by trapping sand, resulting in the vertical accumulation that constitutes the dune itself. 310 CMR 10.28(1), 310 CMR 10.29(1). Barrier beaches are significant to storm damage prevention and flood control and are likely to be significant to the protection of marine fisheries, wildlife habitat, and shellfish. The performance standards for coastal beach and coastal dune apply to all coastal beaches and to all coastal dunes the make up a barrier beach. 310 CMR 10.29(3). While this permit has centered on the performance standard for coastal dune, the regulation would have proponents of work on barrier beaches meet the performance standard for coastal beach as well. Generally, any project on a coastal beach must not have an

[4] The state definition appears to allow either "ridge" or mound" type dunes, as illustrated in the Coastal Construction Manual, Figure 7-62, attached to Inglin Direct Testimony.

adverse effect by increasing erosion, decreasing the volume or changing the form of any such coastal beach or an adjacent or downdrift coastal beach. 310 CMR 10.27(3).

All coastal dunes are likely to be significant to storm damage prevention and flood control, and all coastal dunes on barrier beaches and the coastal dune closest to the coastal beach are per se significant to storm damage prevention and flood control. 310 CMR 28(1). The work proposed for this site involves the coastal dune closest to the coastal beach that is also on a barrier island. The characteristics critical to the protection of the interests are the ability of the dune to erode in response to beach conditions, dune volume, dune form and its ability to be changed by wind and natural water flow, vegetative cover, the ability of the dune to move landward or laterally, the ability of the dune to serve as nesting habitat, and the ability to respond to wave action, including storm overwash sediment transport. 310 CMR 10.28(1), 310 CMR 10.29(1). The coastal wetlands regulations state that the performance standards "shall be interpreted to protect those characteristics and resources to the maximum extent practicable." 310 CMR 10.21.

The performance standard for dunes states that "any alteration of, or structure on, a coastal dune or within 100 feet of a coastal dune shall not have an adverse effect on the coastal dune by affecting the ability of waves to remove sand from the dune, disturbing vegetation so as to destabilize dune, modifying the dune form causing increased potential for storm damage or flooding, interfering with the landward or lateral movement of the dune, causing removal of the sand from the dune artificially, or interfering with bird nesting habitat." 310 CMR 10.28(3). "Adverse effect" is a defined term in the coastal regulations that means "a greater than negligible change in the resource area or one of its characteristics or factors that diminishes the value of the resource area" to an interest of the Act (here, storm damage prevention and flood

control). 310 CMR 10.28(3). "Negligible" means small enough to be disregarded." 310 CMR 10.23 Adverse effect .

A "no adverse effect" standard would appear in itself to set an exceptionally high bar for any alteration of a coastal dune, and the types of projects that may be permitted provided they meet this standard are identified as pedestrian walkways which minimize vegetative cover, fencing and other devices designed to increase dune development, and plantings compatible with natural vegetative cover. 310 CMR 10.28(5). To allow some flexibility for existing buildings, an accessory such as a small shed or small parking area may be permitted notwithstanding the failure to conform fully to the standard provided adverse effects are minimized. 310 CMR 10.28(4). Although the applicant is technically correct in stating that 310 CMR 10.28(4) and (5) do not apply to this project – because it is new development that exceeds the permissible work identified – these provisions convey the high level of protection to be afforded to coastal dunes.

The regulatory standard for work in any coastal dune is quite stringent, appropriate to their protective function and dynamic nature.[5] Because dunes on barrier beaches and the coastal dune adjacent to the beach are singled out as intrinsically important to storm damage prevention and flood control, the performance standards should be applied most strictly in those areas. Similarly, Executive Order 181, signed in 1980, states that "At a minimum, no development shall be permitted in the velocity zones or primary dune areas of barrier beaches identified by the DEQE" (now DEP). The coastal wetlands regulations performance standards "shall be interpreted to protect those characteristics and resources to the maximum extent practicable." 310 CMR 10.21. While the requirements for coastal dunes that are not primary or

[5] See Guidelines for Barrier Beach Management, Massachusetts Barrier Beach Task Force (February 1994) for information about barrier beaches, the regulatory requirements, and managing various public uses.

on barrier beaches are also quite stringent, there may be situations such as work in remnant or backdune areas where the potential for adverse effect or the significance to the interests of the Act are more limited. There may even be situations where a portion of barrier beach within an urbanized area has already been so highly developed that redevelopment will not have an adverse effect.[6]

In this case where new work is proposed on a currently undeveloped primary dune on a barrier beach, strict application of the regulatory standards is certainly appropriate. I recognize that the performance standards do not prohibit any work, they prohibit any adverse effect on the coastal dune and barrier beach. The regulations indicate the quite limited types of activity may be permitted, largely designed to benefit the dune, and allow some flexibility for existing development. 310 CMR 10.28(4) and (5). The wetlands regulations generally establish performance standards that are specifically tailored to protect each type of resource area for the public interests it provides. The level of protection is established, in part, to take into account the cumulative effects of many similar projects that might otherwise be permitted if the impacts of a single project were considered in isolation. The stringency of the regulations for work on a primary dune on a barrier beach reflect a scientifically and policy based determination that limiting development of these areas serves the public interest by reducing public safety concerns and the economic consequences of storm damage and flooding.

Performance Standards Applied to the Site

I conclude from this recitation of the regulatory requirements that the performance standards for this primary coastal dune on a barrier beach are indeed intended to prevent any

[6] An example is Revere Beach, the barrier beach in Revere.

adverse impact.[7] As described below, I find that the primary dune at the site is situated in an area that is still undergoing active erosional and depositional processes, in large part due to human intervention in the natural environment. I also find that the placement of structures in this primary dune will impair its ability to migrate according to the natural forces of wind and water. I find that the placement of structures will interfere with the natural growth and development of dune vegetation at the site. Finally, I find that this decision is not inconsistent with prior cases before the Department, and reaffirm the state policy of protecting barrier beaches from unwise coastal development.

Erosion and Deposition at the Site

The record, particularly the DEIR prepared by the applicant, provides important historical information that illustrates the dynamic nature of this barrier island and its coastal dunes in the vicinity of the site. Although Plum Island itself is between 6,000 and 7,000 years old, the northern end where the project is located was formed only in the late 1800s after the construction of the jetties at the mouth of the Merrimack River. Petitioner's Exhibit 11, DEIR at 2-3 and Figure 4.1.1, showing historical shoreline positions. While there is some dispute over the location of the historical shorelines in the 1900s, there undisputedly have been cycles of erosion and accretion. See Petitioner's Exhibit 11, DEIR at Figure 4.1.3, also shown on Petitioner's Exhibit 11B, Sheet 1 0f 3.

Testimony at the hearing included references to former development on the lot. Transcript, Vol. II, at 74. The DEIR contains two comment letters and the response from the applicant that are more instructive. One neighbor stated that the applicant's and other neighbors houses had been closer to the water and moved back, but now he lacked an ocean

[7] I believe that my interpretation of the legal standard set by the regulations, as well as giving different weight to various parts of the evidence, accounts for my differences with the Recommended Decision. I concur with the Administrative Magistrate that the case presents difficult issues.

view "because there had blown in a primary dune." Petitioner's Exhibit 11, DEIR, Appendix E, Finneran letter. The applicant response was "Precisely," noting the recent accretion as 16.7 ft/yr since 1994. Petitioner's Exhibit 11, DEIR at 68. Another neighbor stated that in 1967 the house on the site, now owned by the applicant, and three abutting houses were moved landward, in 1978 the house and other houses were surrounded by water, and in 1991 water surged down the right of way. Petitioner's Exhibit 11, DEIR, Appendix E, Varoski letter.[8] The applicant's response was that no damage was done to the dune by moving the house, the proposed development would not destablilize the dune with the current shoreline position and mitigation measures, and "[if], as in the past, the dwelling and septic system are threatened by erosion, these structures will be removed from the site." Petitioner's Exhibit 11, DEIR at 69.

Unlike the Administrative Magistrate, I am not persuaded by the Shoreline Change data that this site would not experience erosion, as asserted by the applicant. Recommended Decision at 9-10. The Mean High Water line from 1953, shown on Exhibit 11B, Sheet 1 of 3, is at approximately the current beach dune interface. Although the applicant asserted that erosion and accretion had occurred seaward of this point, that does not mean that the beach and dune system were not also shifted further landward. Transcript, Vol. I at 151-152. More specifically, it appears from the plans that erosion of 28 feet occurred between 1928 and 1953, accretion of 90 feet between 1953 and 1978, erosion of 55 feet between 1978 and 1994, and accretion of 105 feet between 1994 and 2000. Petitioner's Exhibit 11, DEIR at Figure 4.1.1. The distance from the 2000 Mean High Water to the current edge of beach is approximately 100 feet. Although the project is 195 feet from the beach today, the project would be less than 100 feet from the water if the beach had the same width as in 1953. Petitioner's Exhibit 11,

[8] Another letter also states that twenty houses were moved, and gives the distance as "100 yards or more" back from the ocean. Petitioner's Exhibit 11, DEIR, Appendix E, Mack letter.

DEIR at Figure 4.1.1. Although there was some debate over the precision of these figures, the shoreline has undeniably undergone significant movement in the past that may be masked by calculations of a long-term "stable" rate (e.g., -0.03 ft./yr. from 1928 to 1994 at transect 274 according to the Shoreline Change Maps, see Petitioner's Exhibit 11, DEIR at Figure 4.1.2). When Mean High Water is located further inland than it is today, it is likely that the seaward boundary of coastal dune and the primary dune would also be located further inland. Because a barrier beach is a dynamic coastline, the location of the beach, dunes, and velocity zone will change over time. The regulations themselves state that barrier beaches in Massachusetts tend to migrate landward due to the landward movement of sediment by the wind, waves, and tidal current. 310 CMR 10.29(1).

I am also not persuaded that the primary dune will prevent erosion from reaching the site. The Recommended Decision appears to credit the testimony of the applicant as to the "540 sq. ft. rule," which is a measure of dune volume used to determine whether a primary frontal dune will be removed or retreat in response to a 100 year storm.[9] Transcript, Vol. I at 70-73. However, what is described in the testimony and shown on the profile, transferred to the plans, is simply the vertical line marking 540 sq. ft. capacity. Transcript, Vol. I at 133-134.[10] It does not show the eroded profile, which would have sloped landward with the line on the plan showing the results of the 540 sq. ft. rule also falling further landward. See Coastal Construction Manual, Section 7.8. I do not dismiss the concept or methodology of the "540 sq. ft." – or for that matter, the "1,100 sq. ft. rule" also appearing in the record – but I do not credit this calculation as presented. I also am concerned that reliance on the present dune profile may be misplaced, given the evidence of erosion and accretion at the site.

[9] The 540 sq. ft. is a median value based on studies of dune erosion. 53 FR 16269 (May 6, 1988).
[10] The assertion that the dune volume is greater then 540 sq. ft. so that it would not be deemed completely eroded according to the FEMA methodology appears to be correct. Transcript, Vol. I at 134-135.

In addition, there is evidence that the growth of the primary dune is relatively recent, even according to the applicant, and attributable to human intervention by way of dredging and maintenance of the jetties. This growth will not necessarily be sustained, and to the extent it represents an anthropogenic interference in natural coastal processes, it is undesirable. The net gain of sand deposited on this section of Plum Island in all likelihood represents a loss of sand, and erosion, elsewhere along the coast.[11] While littoral processes can be quite complex, it would appear that the existence of land for development at the site is attributable to human activity and its future may depend on the continuation of these activities. Were the sediment supply to be shifted further south to address erosional threats to existing homes there, the sediment to support the coastal dune at this more northern site would be reduced. While the management of the sediment supply to reduce erosion to existing houses may be appropriate, new development of seaward lots during times of accretion would simply exacerbate the recurring issues of the protection of existing homes.

Finally, I again note that the house on the site moved in the 1960s was threatened by erosion to the extent that it was relocated. This relocation did not occur during a period of erosion, as might have been expected. Instead, it actually occurred during the period of accretion between 1953 and 1978 as shown on the applicant's plans. Petitioner's Exhibit 11, DEIR at Figure 4.1.1 and Exhibit 11B, Sheet 1 of 3. Regardless of the debate between the parties over the short-term trend, I conclude that the site is not stable, cycles of erosion and accretion are likely to continue, and the recent accretion does not offer a sound basis for assuming the erosion at this site is not likely. Taking the dynamic nature of the site into account, it is inappropriate to review this project as if the site will remain constant over time, or that any changes in shoreline can be addressed by removing the structures on the assumption

[11] These shifts in upland and tideland may even affect public trust rights and the jurisdiction of M.G.L. c. 91.

that prior to a severe storm there will be such an opportunity. The Recommended Decision viewed the measuring stick for whether the project met the performance standards as "the size of the wave that may be expected to reach the dune . . . and what affect that wave will have." Matter of Giles H. Dunn and Gail W. Dunn, Docket No. 89-072, Final Decision (July 17, 1996). While this question may be answered more predictably at a stable location, it is less relevant for a highly variable shoreline such as this.[12]

Ability of the Dune to Move

Work may not have an adverse effect on a coastal dune by interfering with the landward or lateral movement of the dune. 310 CMR 10.28(3)(d). In this case, the applicant asserts that the dune normally would be able to migrate over the system, but "if exposed to wave action, the facility would be eroded with the dune." Humphries Direct Testimony, at D.1. Using a velocity zone elevation of 14, and a leaching field elevation of 17, the system would be undercut from below and collapse as the dune is eroded beneath it. Transcript, Vol. I, p. 140.

The approximate size of this septic system can be drawn from the plans at Petitioner's Exhibit 11C. The septic/recirculation tank, made of concrete, is approximately 13 ft. long by 7 ft. wide by 6½ ft. high. The sand filter tank, also made of concrete, is approximately 12½ ft. long by 6½ ft. wide by 5½ ft. high. Petitioner's Exhibit 11C, Sheet 3 of 4.[13] Each of these is larger than an automobile. The distribution box, also concrete, is 1 ¼ ft. by 1 ¼ ft. There are two trenches, with approximate dimensions of 28 ft. by 4 ft. Petitioner's Exhibit 11C and Direct Testimony of Kevin Klein, para. 7, referencing letter from the applicant to the Department included as Petitioner's Exhibit 15. The trenches each contain a 4 inch diameter

[12] Because of this perspective, I attach less importance to the testimony about indicia of overwash or other wave action at the site since the time of application and later issuance of the superseding order of conditions. My Decision is not based on credibility of the witnesses.

[13] The witness described a single structure, approximately 6 ft. by 8 ft. by 4 ft. Transcript, Vol. I at 148.

PVC pipe 25 1/2 ft. long. These pipes lie upon a bed of stone 4 ft. wide and 2 ft. deep. Nonetheless, the petitioner asserts that there would be no adverse effect on the form of the entire dune on the site. Transcript, Vol. I at 148. I note that there is also evidence in the record that the septic system, or at least some of its components, that serve the house on the adjacent lot are already located on this lot within the primary dune.[14]

I find that the installation of this septic system within a primary coastal dune on a barrier beach, either attribute having per se significance to storm damage prevention or flood control, will have an adverse effect on the dune by interfering with the landward or lateral movement of the dune. Waves would strike the concrete tanks and scour around them. The components of the system would be strewn around the dune and embedded in the sediment. While structures may not be visible on the surface of the dune, they will remain within the dune's volume and may reemerge at some point in the future as debris. Debris that becomes waterborne may wash on to other beaches or become embedded under the water on Commonwealth land. The presence of these large structures and associated pipes in an area with an erosional history as active as this location will impair the ability of the dune to function naturally.[15]

Disturbance of Vegetation

Work may not have an adverse affect on a coastal dune by disturbing the vegetative cover so as to destabilize the dune. 310 CMR 10.28(3)(b). The applicant has proposed a plan designed to increase vegetation on the dune. The proposal is intended to both compensate for the disturbance of dune grass as it is moved from its existing location and transplanted to allow

[14] This may be the same system, now upgraded, that served the house that had been moved landward, but it is also possible there was a third system.
[15] I concur with the testimony of the Department that erosion that occurs during a severe storm can cause pollution.

for the construction of the house, driveway and septic system. The plan is intended in part to increase the stability of the dune by increasing the amount of vegetation at the site and by planting more robust species, such as rosa rugosa, which does not presently occur at this site. See Decie Direct Testimony and Petitioner's Exhibit 11B, Sheet 3 0f 3. The Administrative Magistrate recommended the addition of conditions to provide for long-term monitoring and replanting. Recommended Decision at 19.[16]

I have several concerns about the disturbance of vegetation at this site and the vegetation plan. First, I am not persuaded that planting vegetation to increase dune growth beyond what would naturally occur in order to add protection to this proposed property is advisable. Sand that it trapped at this site deprives another area of its source of sediment. The DEIR states that there are erosion problems, losses of cottages, serious reduction in lot sizes, and total loss of some lots further south along Plum Island. Petitioner's Exhibit 11, DEIR at 26. Retaining the natural littoral movement of sand along barrier beaches so that the volume of downdrift sediment supply remains constant is important to the lateral movement of the sediment in the dune. See Wilson v. Commonwealth, 31 Mass. App. Ct. 757, 760 (1992) (distinguishing between coastal dunes and coastal banks); Lummis v. Lilly, 385 Mass. 41 (1982)(littoral rights of adjacent oceanfront property owners). While trapping sand may benefit this property by increasing the size of the dune at this location, houses to the south may be further jeopardized. There is some evidence in the record that the problems in the south may lead to beach nourishment there, which could increase erosion at this site. While using vegetation or other measures for dune growth may be appropriate to protect existing development, it is not warranted to justify new development.

[16] The performance standards for coastal dune do not identify replication to compensate for disturbance of dune vegetation, in contrast to bordering vegetated wetlands at 310 CMR 10.55.

Second, I do not believe that the vegetation can "mitigate" for the size of the pile-supported structure. The addition of the deck almost doubles the size of the house, and I am not persuaded that the light through the open grid will support natural growth of dune grass. Because dune grass traps sediment, partial shading under the deck and partial or complete shading under the building, which together total almost 2000 sq. ft., will reduce the growth of vegetation and affect the form of the dune to some extent. Finally, although it would seem quite innocuous, the human impact on dune grass around structures can be quite damaging and should not be minimized. The removal of vegetation in the driveway area and under the house has been in part mitigated by the use of impervious surface and gravel, but I cannot find that these surfaces will trap sand or otherwise function in the same way as dune vegetation would were it allows to colonize naturally at the site. While the entire dune would not necessarily suffer from interference with the natural vegetation at this site, there is the potential for local effects such as weakening, slumping, or blow out which would allow water to reach property further inland.

Finally, I cannot commit the Department to the enforcement of long-term monitoring conditions that would have to remain in place for perpetuity. While orders of conditions under the Wetlands Protection Act may become "continuing conditions" remaining in effect after the expiration of the order, they are not appropriate to support work in a dynamic system such as this. Given the record of erosion and accretion at the site, the vegetation plan will not necessarily be appropriate over time. I cannot conclude that the dune will not be destabilized by the removal of the existing vegetative cover.[17]

[17] While the parties did not identify other performance standards as issues for adjudication, it would appear that the disturbance of vegetation and resulting effect on dune growth could, over time, affect the ability of waves to remove sand from the beach. 310 CMR 10.28(3)(a). Similarly, an enlarged dune form could be modified, with the

Consistency with Prior Cases; Conditions Requiring Removal

The Recommended Decision relied on a prior case in focusing predominantly on the size of the wave and the effect of that wave. Recommended Decision at 13, citing Matter of Dunn, Docket No. 89-072, Final Decision (July 17, 1996).[18] In fact, Dunn involved the denial of a superseding order and ultimately a variance to an applicant proposing a new pile-supported house and septic system on a primary dune and barrier beach adjacent to an existing house, a situation that most closely corresponds to the situation presented here.[19] The petitioner cited other cases, but they would seem inapposite here. Matter of Stanley involved work on a coastal dune and barrier beach, but the project was to replace three buildings, one on a foundation, with a single smaller structure on piles without a septic system.[20] Matter of Deborah M. Stanley and Donald D. Stanley, Docket No. 99-033, Final Decision (March 27, 2001). Both Matter of Longo and Matter of Anderson involved construction of houses with septic systems, but on land subject to costal storm flowage, not coastal dune on a barrier island. Matter of Blake Anderson, Docket No. 95-085, Final Decision (April 8, 1997). Matter of Edward Longo, Docket No. 91-001, Final Decision (February 7, 1996).[21]

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result of increasing erosion and causing storm damage on downdrift beaches. 310 CMR 10.28(3)(c). See also 310 CMR 10.27(3).

[18]Other than this citation to Dunn, the Recommended Decision did not look to prior decisions for past practice as to protection of coastal dunes.

[19] As noted above, the locus in Dunn was less active in terms of erosion and depositional processes than this site on Plum Island.

[20]In Matter of Kelly, the project was on a barrier beach and dune, but not a primary dune and involved replacement of an existing foundation with a pile-supported residence; although the applicant had proposed the area beneath the house be used for parking, based upon a finding that sand would naturally be deposited there and need to be removed, the final order contained a condition that prohibited parking under the house. Matter of Robert D. and Rose Marie Kelly, Docket No. 82-42, Final Decision (October 7, 1983).

[21] Land Subject to Coastal Storm Flowage is land inundated by a coastal 100-year storm or storm of record, whichever is greater. 310 CMR 10.04. The regulations currently have no performance standards for this resource area. Because its functions differ from dunes or barrier beaches, it is reasonable to assume that the level and type of protection afforded would differ as well.

Matter of LaFrance allowed a pile-supported single family house and septic system on a primary coastal dune but not a barrier beach. Matter of Diane LaFrance, Docket No. 84-36, Final Decision (May 24, 1993). In that case, the applicant proposed a condition requiring removal of the septic system if erosion reached the house, which was 75 feet closer to the beach. A similar condition is proposed for the Peabody project, although in this case the septic system is directly under the house and both the house and the septic system would be removed if erosion approaches. In addition to the distinction that this precedent did not involve a barrier beach, I am reluctant to endorse this type of condition.

In this case, I note that when the house was moved in the 1960s, it apparently was relocated to the adjacent, more landward lot that was then under the same ownership. Petitioner's Exhibit 11, DEIR, Appendix E, Varoski letter. There is no place more landward on the lot to move this proposed house and septic system, and the applicant has conveyed the seaward lots to a trust. There would also be no place for relocation of other houses, were additional proposals for siting structures seaward of other houses moved landward in the 1960s to be allowed by the Department. Finally, severe erosion that jeopardizes structures may occur suddenly during severe storms. Locating houses in areas so compromised that they require a condition for removal jeopardizes the safety of emergency officials and other citizens, well beyond the practical problems arising in imposing a requirement that equipment or other resources be made available for this purpose.

Conclusion

As to the wetlands appeal, I deny the project because it fails to meet the performance standards for work on a primary coastal dune on a barrier beach, a highly protected resource area under the Wetlands Protection Act because of its contribution to the public interests of

storm damage protection and flood control. My decision is based on the facts specific to this site, as well as my unwillingness to allow new development of coastal property during times of accretion on the assumption it can be moved or dismantled when the inevitable erosional cycle takes its toll. In doing so, I reaffirm the Department's commitment to the protection of public health and safety that would otherwise be jeopardized by unsound coastal development.

I issue this decision as a Tentative Decision in the interest of justice, to allow the parties an opportunity to identify errors and to respond to aspects of this Decision that may not have been addressed in the post-hearing briefs. 310 CMR 1.01(14)(a). The parties to this proceeding may file, with the Commissioner's Office, objections to the decision or supporting arguments within seven days of its receipt.

Robert W. Golledge, Jr.
Commissioner